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averages are discussed. The two chapters on "Index Numbers" show very well not only some of the purposes to which such numbers may be put but the serious consequences of the loose and indiscriminate use of indices.

The part of the book that uses mathematical concepts is well illustrated by concrete applications, but the reviewer offers the following criticisms:

On p. 387 we find the statement: "If, however, signs are disregarded, the aggregate deviations are larger when taken from the arithmetic mean than when taken from any other average, for the reason that this average is affected both by the size of items and the frequencies." This statement is incorrect, as can be shown easily by giving a well-selected illustration in which the mode is near the end of the distribution. That is to say, we can easily give an illustration in which the average deviation from the mode is greater than from the arithmetic mean.

On p. 388 there is the statement that "mathematical consistency seems to demand that the median be used. On the other hand, the *average* deviation requires that the total be averaged, that is, divided by the number of items, and logical consistency seems to demand that they be computed from the mean." It is not clear to the reviewer what this statement means, as it is not indicated what distinction exists between mathematical consistency and logical consistency.

On p. 453 there occurs the statement: "If $r = 0$, no correlation exists, changes in the two phenomena being indifferent." This statement does not seem to be correct. To be sure, when two variates are independent, we have $r = 0$, but the converse is not necessarily true. The statement quoted seems to imply that the converse is true.

As shown by illustrations in this book, the use of the correlation coefficient and the attendant theory may help very much to throw light on the tendency of two sets of economic phenomena to change together, but such applications should be made with a clear understanding of the limitations imposed in the mathematical development of the theory.

H. L. RIETZ.

UNIVERSITY OF ILLINOIS.

Elliptic Integrals. By HARRIS HANCOCK. John Wiley and Sons, New York, 1917. 104 pages. $1.25.

Professor Hancock's book is the eighteenth in the series of "Mathematical Monographs" edited by Mansfield Merriman and Robert S. Woodward. It furnishes a useful guide to students who have completed an elementary course in the calculus and wish to extend their study to a consideration of types of integrals not treated in a first course. As is to be expected in so short a discussion, Professor Hancock's book treats only the formal aspects of the subject and chiefly the integrals of the first and second kinds with the standard transformations into the normal forms. The discussion of elliptic functions and their transformations is brief but well balanced, the interest being centered where it should be, upon the doubly periodic nature of the functions. A great many examples and problems are given. The five-place tables at the end of the book and the many reduction and other formulas of integrals in the text give in compact form the material most often needed for reference.

RAYMOND W. BRINK.

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NOTES ON NEW BOOKS.

"Isaac Barrow was the first inventor of the infinitesimal calculus; Newton got the main idea of it from Barrow by personal communication; and Leibniz also was in some measure indebted to Barrow's work, obtaining confirmation of his own original ideas, and suggestions for their further development, from the copy of Barrow's book that he purchased in 1673." This is a quotation from the preface to "The geometrical lectures of Isaac Barrow, translated with notes and proofs and a discussion on the advance made therein on the work of his predecessors in the infinitesimal calculus" by J. M. Child, B.A. (Cantab.), B.Sc. (Lond.) The book is No. 3 of the "Open Court Series of Classics of Science and Philosophy." It is published by the Open Court Publishing Company, Chicago and London.

A revised edition of "Plane geometry with problems and applications" by H. E. Slaught and N. J. Lennes has just been published by Allyn and Bacon, Boston and Chicago. Practical applications to everyday life are a feature of the book. Here are two sample ones: (1) "In kicking a goal after a touchdown in the game of football, the ball is brought back into the field at right angles to the line marking the end of the field. The distance between the goal posts being given, and also the point at which the touchdown is made, find by a geometrical construction how far back into the field the ball must be brought in order that the goal posts may subtend the greatest possible angle." (2) "A car wheel is broken, and it is required to determine its diameter by construction when only a fragment of it is given." At the very beginning of the book there are two pages of "reasons why geometry should be studied by those who wish to obtain a generous culture, a broad outlook and a mental development characterized by logical thinking and clear expression." These two pages and the book itself are a good answer to those who are questioning the value of geometry as a subject of study in the high school.

The number of trigonometry textbooks on the market is still increasing. P. Blakiston's Son and Co. of Philadelphia have recently published "Plane trigonometry with tables" by Eugene Henry Barker, head of the department of mathematics of the Polytechnic High School of Los Angeles, California.

The society in England which corresponds to the "Mathematical Association of America" is called the "Mathematical Association." It publishes the *Mathematical Gazette*. One of its past presidents, Professor A. N. Whitehead, has recently published in one volume eight addresses which he has given in recent years on educational, mathematical and scientific topics. They ought to be of